

Claims

1. A method of measurement reporting in a telecommunication system comprising mobile stations and a network comprising base stations, wherein decisions upon establishing or canceling a link between a mobile station and a base station are made in the network on the basis of measurement reports sent from the mobile station to the network,

characterized in that the method comprises the steps of defining at least two independent measurement report triggering conditions,

monitoring at the mobile station properties of a plurality of radio signals received from respective base stations,

generating a measurement report comprising information about the monitored radio signals at the mobile station when at least one of the triggering conditions is met, and

15 transmitting the generated measurement report to the network.

2. A method according to claim 1 ~~or 2~~, **characterized** in that the activity of at least one of the triggering conditions is defined by the network.

3. A method according to claim 1 or 2, **characterized** in that
the method further comprises a step of resetting a timer in
20 connection with the step of transmitting a measurement report, and

at least one of the trigger conditions comprises a condition for the value of the timer.

4. A method according to claim 1 or 2, **characterized** in that at least one of the trigger conditions is a threshold for a radio signal parameter or a function thereof.

5. A method according to claim 4, **characterized** in that the radio signal parameter is the received power level of the signal or a function thereof.

30 6. A method according to claim 4, **characterized** in that the radio signal parameter is the interference in the received radio signal or a function thereof.

7. A method according to claim 6 in a network using CDMA air interface in which the connections are separated using different spreading codes, **characterized** in that the value for the interference is an estimate for

the interference power made before the signal is correlated with the spreading code used in the connection.

5 8. A method according to claim 6 in a network using CDMA air interface in which the connections are separated using different spreading codes, **characterized** in that the value for the interference is an estimate for the interference power made after the signal has been correlated with the spreading code used in the connection.

9. A method according to ~~any of claims 4 to 8~~, **characterized** in that the trigger condition comprises a base station specific offset value.

10. A method according to claim 9, **characterized** in that at least one of the offset values is dynamically defined by the network.

11. A method according to ~~any of claims 4 to 8~~, **characterized** in that the trigger condition comprises a threshold for the change of a radio parameter or a function thereof.

12. A method according to ~~any of claims 4 to 8~~, **characterized** in that

a first set of trigger conditions is defined for the radio signals in the uplink direction and a second set of trigger conditions is defined for the radio signals in the downlink direction,

a logical function is defined for combining the first and the second set of trigger conditions, and

at the mobile station, the state of each trigger condition is determined, the states combined using the logical function, and the measurement report is sent in dependence upon the condition of the logical function.

13. A method according to claim 12, **characterized** in that the first and second set of trigger conditions are dynamically defined by the network.

14. A method according to claim 12, **characterized** in that the logical function is defined by the network.

15. A method according to ~~any of claims 12 to 14~~, **characterized** in that a first combination of the first and second sets of trigger conditions and the logical functions are defined to be used for radio signals from or to active base stations having an active link with the mobile station,

a second combination of the first and second sets of trigger conditions and the logical functions are defined to be used for radio signals from or to candidate base stations not having an active link with the mobile station,

and at the mobile station, the first combination is used for radio signals from or to active base stations and the second combination is used for radio signals from or to candidate base stations.

5 16. A method according to claim 15, and **comprising** the step of creating an active link between the mobile station and a candidate base station not having an active link with the mobile station when the network receives from the mobile station a measurement report triggered by that candidate base station.

10 17. A method according to claim 15, and comprising the step of deleting an active link between the mobile station and a base station when the network receives from the mobile station a measurement report triggered by that active base station.

15 18. A method according to ~~any of the claims 15 to 17,~~¹ **characterized** in that said two different logical functions are such that when a base station is in the active set, a measurement report is not triggered by a radio signal of that base station for the same set of radio properties as would trigger the transmission of a measurement report when the base station is in the candidate set.

20 19. A method according to ~~any one of the claims 12 to 18,~~¹ **characterized** in that the method comprises a step of defining a logical function for use when the number of base stations in the active set is equal to a predefined maximum number, and defining the first and second sets of trigger conditions on the basis of the radio signal properties of the active base station having the worst signal conditions, and wherein a measurement report is triggered by a radio signal of a candidate base station causes that worst base station to be replaced by the candidate base station.

25 20. A method according to claim 19, **characterized** in that the maximum number is dynamically defined by the network.

30 21. A method according to claim 1 ~~or 2,~~ **characterized** in that the network informs the mobile station what information to include in the measurement report, and the mobile station includes this information in the measurement report.

35 22. A method according to claim 22, **characterized** in that the radio signals are ordered using a predefined condition, and in the measurement report sent from the mobile station, information about the properties of a predefined number of the best radio signals according to the condition are reported.

23. A method according to claim 21, **characterized** in that the number of radio signals to be reported is given by the network.

24. A method according to claim 21, **characterized** in that the measurement report comprises a value for the path loss for a reported signal or a function thereof.

25. A method according to claim 21, **characterized in** that the measurement report comprises a value for the carrier to interference ratio of a reported signal or a function thereof.

26. A telecommunication network for a telecommunication system comprising mobile stations and a network comprising base stations, in which system the mobile stations monitor radio signals sent by the base stations, **characterized** in that the network comprises

a determining means for determining a plurality of independent trigger conditions for triggering the transmission of a measurement report from the mobile station and

sending means responsive to the determining means for sending the determined trigger conditions to a mobile station.

27. A telecommunications network according to claim 26, **characterized** in that the determining means are further arranged to define the activity of respective trigger conditions, and the sending means are arranged to send information about the activity state to the mobile station.

28. A network element for a telecommunication network for a telecommunication system comprising mobile stations and a network comprising base stations, in which system the mobile stations monitor the radio signals sent by base stations, **characterized** in that the network element comprises

a determining means for determining a plurality of independent trigger conditions for triggering the transmission of a measurement report from the mobile station and

sending means responsive to the determining means for sending the determined trigger conditions to a mobile station.

29. A mobile station for a telecommunication system comprising mobile stations and a network comprising base stations, and the mobile stations monitor radio signals sent by the base stations, **characterized** in that the mobile station has

receiving means for receiving trigger conditions from the network for triggering the transmission of a measurement report,

monitoring means for monitoring the radio signals,

a plurality verifying means which is responsive to the receiving means and for the monitoring means and which has the functionality of verifying whether the trigger conditions for sending a measurement report of a specified type are met,

a plurality of report means responsive to the verifying means for establishing a measurement report, and

sending means responsive to the report means for sending a measurement report to the network.

30. A mobile station according to claim 29, **characterized** in that the receiving means are arranged to receive at least first and second different set of trigger conditions for uplink and downlink signals, and a logical function for combining these sets of trigger conditions,

the verifying means are arranged to determine the states of each trigger condition and to combine the states according to the logical function, and

the report means are arranged to establish a measurement report to be sent by the sending means in dependence upon the condition of the logical function.

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